

Metal Industry Indicators

Indicators of Domestic Primary Metals, Steel, Aluminum, and Copper Activity

December 1999

The primary metals leading index was flat in November, and its growth rate has slowed considerably in the past 5 months. As such, the leading index seems to be pointing to slower growth in primary metals activity in the months ahead. The metals price leading index decreased for the third consecutive month in October. While other indicators suggest the possibility of increases in some metal prices, metal price growth could slow in the near term.

The **primary metals leading index** was unchanged in November, holding at October's revised level of 129.0, while its 6-month smoothed growth rate, a compound annual rate that measures the near-term trend, slowed to 1.4% from a revised 2.0% in October. A growth rate above +1.0% is usually a sign of an upward near-term trend for future metals activity, while a growth rate below -1.0% indicates a downward near-term trend.

Only four of the index's eight components were available in time for the November index calculation. Although none of those components moved very much from their October levels, one component in particular, the length of the average workweek in primary metals establishments, has been unusually flat over the past 7 months and is unchanged at 44.4 hours since August. Two components, the S&P stock price index for diversified machinery companies and the Purchasing Managers' Index, posted modest decreases in November, while the growth rate of the Journal of Commerce Metals price index was up slightly.

The growth rate of the primary metals leading index has slowed considerably since last summer. It suggests that growth in U.S. metals activity over the next few months will be slow at best.

The **steel leading index** rose 0.3% in October, the latest month for which it is available, recovering only a small portion of September's nearly 2-percent drop. The index increased to 111.5 from a revised 111.2 in September, while its 6-month smoothed growth rate was unchanged from September's revised 0.9%. Gains in inflation-adjusted shipments of household appliances and the number of permits for new U.S. private housing made the largest positive contributions to the net increase in the leading index. The S&P stock price index for steel companies and the growth rate of the inflation-adjusted M2 money supply were the largest negative contributors. The growth rate of the steel leading index suggests slower growth in steel industry activity in the near future.

The **aluminum mill products leading index** dropped 1.7% in October, falling to 154.9 from a revised 157.5 in September, and its 6-month smoothed growth rate sank to -1.6% from a revised

1.6% in September. After revisions to component data, the aluminum mill products leading index has now decreased in each of the past 4 months. The largest negative contributors to the net decrease in the October leading index were the length of the average workweek in aluminum mill products establishments and new orders for aluminum mill products. The 6-month smoothed growth rate of the leading index appears to be signaling slower near-term growth for U.S. aluminum mill products activity.

The **primary aluminum leading index** slipped 0.8% in October, down to 92.3 from a revised 93.0 in September, and the index's 6-month smoothed growth rate slowed to 4.2% from a revised 6.5% in September. Five of the index's seven components moved lower in October. In spite of the October decline, the growth rate of the primary aluminum leading index remains high, but growth in industry activity could slow over the next few months. (Tables and charts for the primary aluminum indexes are in a separate file.)

The **copper leading index** decreased 0.6% in October, down to 131.4 from a revised 132.2 in September. Its 6-month smoothed growth rate slowed to 1.2% from a revised 2.9% in September. The largest negative contributions came from the S&P stock price index for building materials companies and the ratio of shipments to inventories for electronic and other electrical equipment. The growth rate of the copper leading index has slowed in recent months and is now pointing to more weak growth in U.S. copper activity. High inventory levels and industry consolidation are also likely to limit copper industry growth.

Mixed Signals from Metals Price Indicators

The **metals price leading index** decreased 0.8% in October, the latest month for which it is available, to 96.1 from a revised 96.9 in September. The index's 6-month smoothed growth rate also fell, sliding to -3.5%, its lowest growth rate since May 1995. Three of the index's four components, the 6-month smoothed growth rates of the OECD total leading index, the inflation-

adjusted value of new orders for U.S. nonferrous metals, and the inflation-adjusted value of U.S. M2 money supply, decreased in October. The fourth component, the growth rate of building permits for new U.S. housing, moved higher, recovering much of the ground it lost last month.

The 6-month smoothed growth rate of the inflation-adjusted value of U.S. nonferrous metal products inventories, an indicator of the supply of metals, slowed to -8.3% in October from a revised -6.0% in September. This is the lowest growth rate for this indicator since February 1995. Also, the actual level of these inventories was the lowest since May 1998.

The leading index of metal prices, an indicator of the demand for metals, is pointing to slower growth in overall metal prices. We have been experimenting with a new metals price leading index, which we hope to present in the first quarter of next year. This new index is also pointing to slower growth in metal prices in the near term.

Although the declining growth rate of metal inventories points to the possibility of increases in overall metal prices in the near

term, the recent movements of both our old and new leading indexes are pointing to slower growth in metal prices in the months ahead.

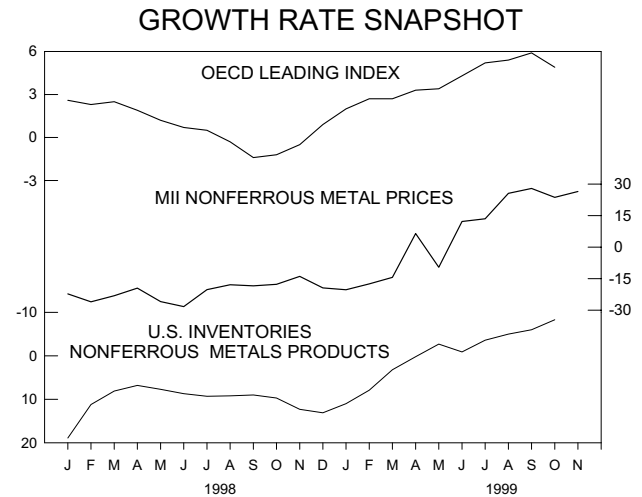


Table 1.
Leading Index of Metal Prices and Growth Rates of the Nonferrous Metals Price Index, Inventories of Nonferrous Metal Products, and Selected Metal Prices

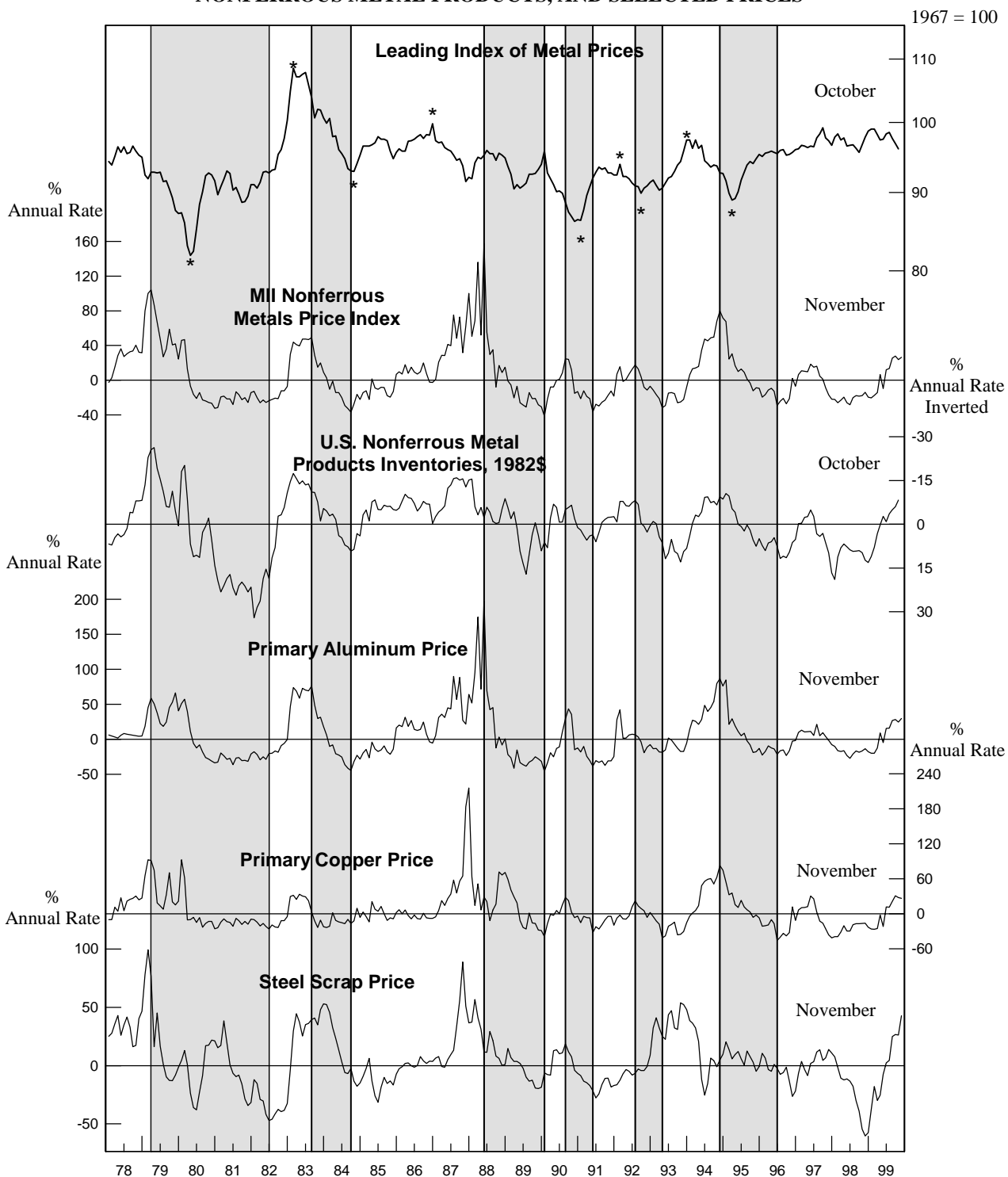
	Leading Index of Metal Prices (1967=100)	Six-Month Smoothed Growth Rates				
		MII Nonferrous Metals Price Index	U.S. Nonferrous Metal Products Inventories (1982\$)	Primary Aluminum	Primary Copper	Steel Scrap
1998						
October	96.7r	-17.7	9.7	-16.8	-16.5	-54.5
November	97.8r	-13.9	12.3	-13.5	-15.9	-60.2
December	98.7r	-19.4	13.1	-18.0	-23.0	-57.4
1999						
January	99.0r	-20.3	11.0	-20.2	-26.0	-37.5
February	99.0r	-17.5	7.9	-20.2	-26.4	-17.8
March	98.2r	-14.4	3.2	-12.6	-25.1	-29.8
April	97.4	6.5	0.2	8.8	-1.7	-25.3
May	97.5r	-9.6	-2.7	-4.9	-21.7	-7.6
June	98.3r	12.2	-0.9r	15.3	11.7	2.2
July	98.5r	13.5	-3.6	15.8	11.4	4.4
August	97.6r	25.6	-5.0	26.7	21.7	24.9
September	96.9r	27.9	-6.0r	28.0	31.0	26.6
October	96.1	23.7	-8.3	24.4	28.0	26.2
November	NA	26.5	NA	29.4	26.5	42.7

NA: Not available r: Revised

Note: The components of the Leading Index of Metal Prices are the 6-month smoothed growth rates of the following: 1, the deflated value of new orders for nonferrous metals; 2, the OECD leading index, total; 3, the index of new private housing units authorized; and 4, the deflated value of U.S. M2 money supply. The Metal Industry Indicators (MII) Nonferrous Metals Price Index measures changes in end-of-the-month prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange (LME). The steel scrap price used is the price of No. 1 heavy melting. Inventories consist of the deflated value of finished goods, work in progress, and raw materials for U.S.-produced nonferrous metals and nonferrous metal products. Six-month smoothed growth rates are based on the ratio of the current month's index or price to its average over the preceding 12 months, expressed at a compound annual rate.

Sources: U.S. Geological Survey (USGS); American Metal Market (AMM); the London Metal Exchange (LME); the Bureau of the Census; and the Organization for Economic Cooperation and Development (OECD).

CHART 1.
LEADING INDEX OF METAL PRICES AND GROWTH RATES
OF NONFERROUS METALS PRICE INDEX, INVENTORIES OF
NONFERROUS METAL PRODUCTS, AND SELECTED PRICES



Shaded areas are downturns in the nonferrous metals price index growth rate. Asterisks (*) are peaks and troughs in the economic activity reflected by the leading index of metal prices. Scale for nonferrous metal products inventories is inverted.

Table 2.
The Primary Metals Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1998				
December	125.6r	-2.8r	110.3r	-2.3r
1999				
January	126.3r	-1.4r	110.5r	-1.7r
February	126.7r	-0.5	110.1r	-2.0r
March	127.1r	0.5	111.4r	0.6
April	127.9r	1.9	111.0r	0.1r
May	129.2r	4.0r	111.5r	1.2r
June	129.9r	5.0	112.2r	2.3
July	129.6r	4.2r	113.1r	3.8r
August	129.9r	4.3r	113.4	3.9r
September	128.8r	2.2r	113.2	3.3
October	129.0r	2.0r	113.1	2.8
November	129.0	1.4	NA	NA

NA: Not available r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 3.
The Contribution of Each Primary Metals Index Component to the Percent Change in the Index from the Previous Month

Leading Index	October	November
1. Average weekly hours, primary metals (SIC 33)	0.0r	0.0
2. S&P stock price index, machinery, diversified	-0.2r	-0.1
3. Ratio of price to unit labor cost (SIC 33)	0.5	NA
4. JOC metals price index growth rate	0.0r	0.1
5. New orders, primary metals, (SIC 33) 1982\$	-0.1	NA
6. Index of new private housing units authorized by permit	0.3	NA
7. Growth rate of U.S. M2 money supply, 1992\$	-0.2	NA
8. Purchasing Managers' Index	-0.1r	-0.1
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	0.2r	-0.1
Coincident Index	September	October
1. Industrial production index, primary metals (SIC 33)	-0.2	0.3
2. Total employee hours, primary metals (SIC 33)	-0.1r	-0.1
3. Value of shipments, primary metals, (SIC 33) 1982\$	0.0	-0.4
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.2r	-0.1

Sources: Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's; 3, Center for International Business Cycle Research, Bureau of Labor Statistics, and Federal Reserve Board; 4, Journal of Commerce; 5, Bureau of the Census and U.S. Geological Survey; 6, Bureau of the Census and U.S. Geological Survey; 7, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 8, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey. All series are seasonally adjusted, except 2, 3, and 4 of the leading index.

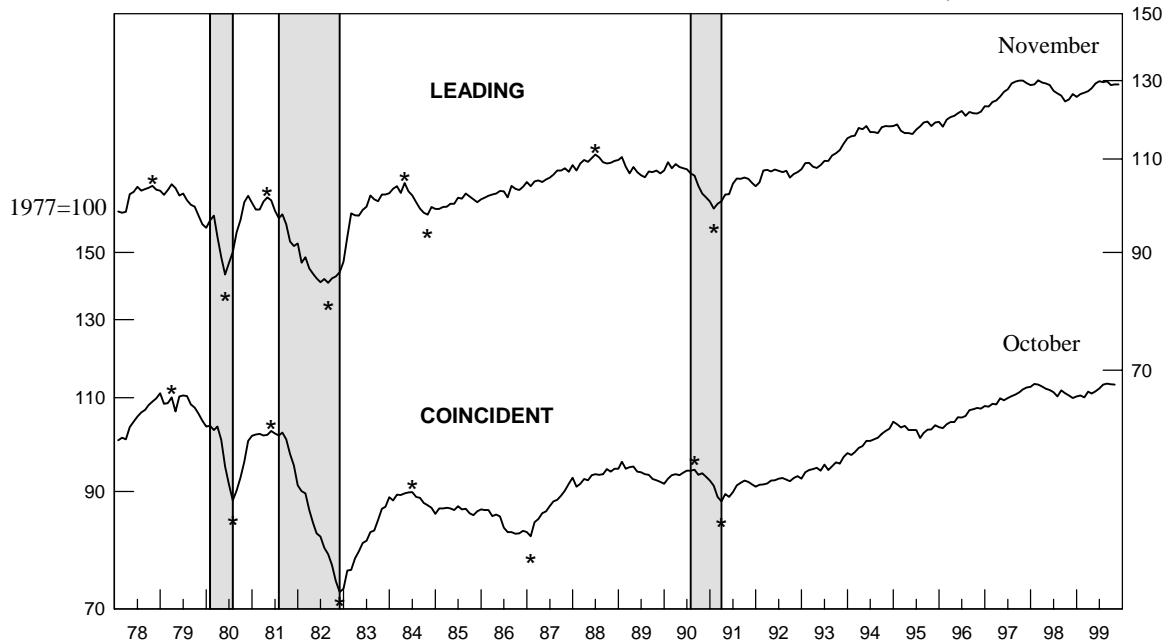
NA: Not available r: Revised

Note: A component's contribution, shown in Tables 3, 5, 7, and 9, measures its effect, in percentage points, on the percent change in the index. Each month, the sum of the contributions plus the trend adjustment equals (except for rounding differences) the index's percent change from the previous month.

CHART 2.

PRIMARY METALS: LEADING AND COINCIDENT INDEXES, 1978-99

1977=100

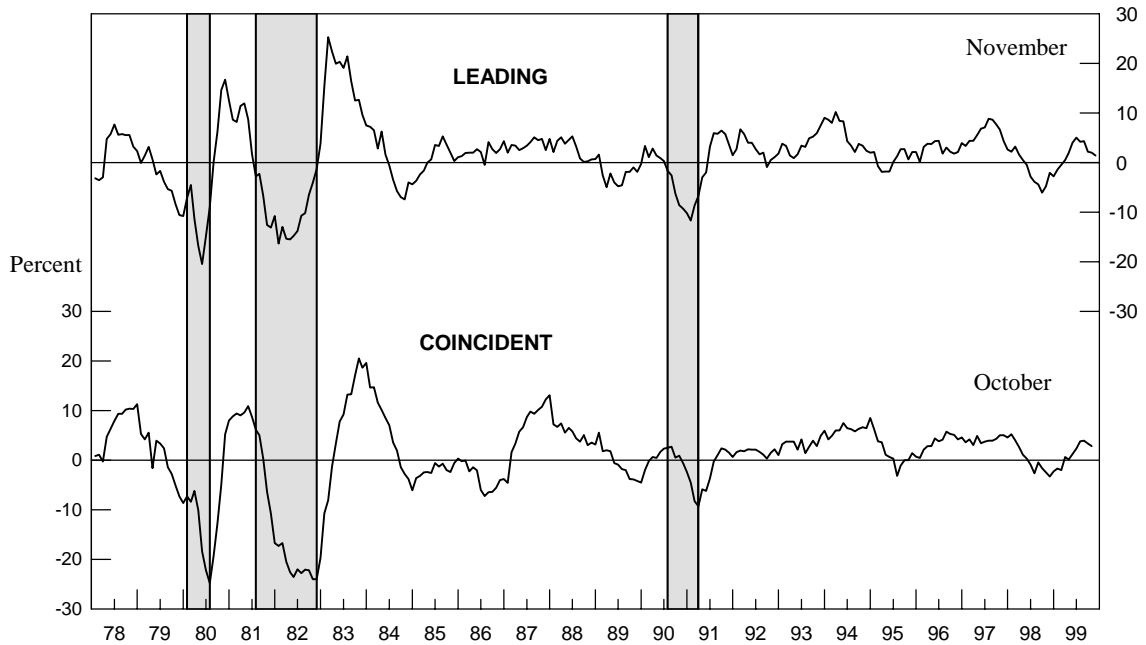


Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 3.

PRIMARY METALS: LEADING AND COINCIDENT GROWTH RATES, 1978-99

Percent



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

Table 4.
The Steel Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1998				
November	109.0r	-1.9r	96.7r	-5.7r
December	108.4r	-2.6	96.7	-5.1r
1999				
January	110.0r	0.6	97.2	-3.6r
February	111.9r	3.9r	97.4r	-2.7r
March	110.6r	1.7r	98.4	-0.3r
April	111.6r	3.6r	98.6r	0.6r
May	112.6	5.4r	99.2	1.9r
June	113.1r	6.0	99.6r	2.8r
July	112.7r	4.9r	100.3r	4.1r
August	113.2r	4.8	101.1r	5.4r
September	111.2r	0.9r	101.0r	4.8r
October	111.5	0.9	101.6	5.6

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 5.
The Contribution of Each Steel Index Component to the Percent Change in the Index from the Previous Month

Leading Index		September	October
1. Average weekly hours, blast furnaces and basic steel products (SIC 331)		-0.1r	0.1
2. New orders, steel works, blast furnaces, and rolling and finishing mills, 1982\$, (SIC 331)		-0.1	0.0
3. Shipments of household appliances, 1982\$		-0.7	0.5
4. S&P stock price index, steel companies		-0.4	-0.3
5. Industrial production index for automotive products		-0.3	0.1
6. Growth rate of the price of steel scrap (#1 heavy melting, \$/ton)		0.1	0.0
7. Index of new private housing units authorized by permit		-0.4	0.3
8. Growth rate of U.S. M2 money supply, 1992\$		-0.3r	-0.2
9. Purchasing Managers' Index		0.4	-0.1
Trend adjustment		0.0	0.0
Percent change (except for rounding differences)		-1.8r	0.4
Coincident Index			
1. Industrial production index, basic steel and mill products (SIC 331)		-0.2	0.4
2. Value of shipments, steel works, blast furnaces, and rolling and finishing mills (SIC 331), 1982\$		0.0	0.0
3. Total employee hours, blast furnaces and basic steel products (SIC 331)		-0.1r	0.1
Trend adjustment		0.1	0.1
Percent change (except for rounding differences)		-0.2r	0.6

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey; 4, Standard & Poor's; 5, Federal Reserve Board; 6, Journal of Commerce and U.S. Geological Survey; 7, Bureau of the Census and U.S. Geological Survey; 8, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 9, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of the Census and U.S. Geological Survey; 3, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted, except 4 and 6 of the leading index.

r: Revised

CHART 4.
STEEL: LEADING AND COINCIDENT INDEXES, 1978-99

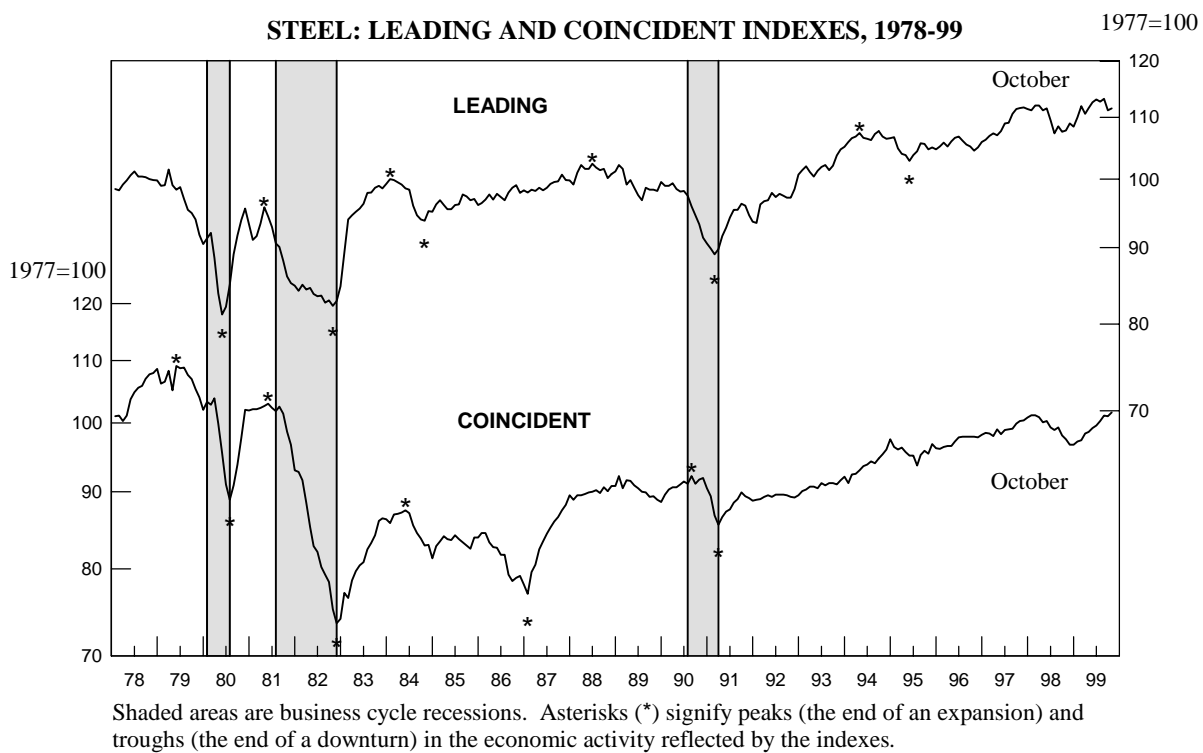


CHART 5.
STEEL: LEADING AND COINCIDENT GROWTH RATES, 1978-99

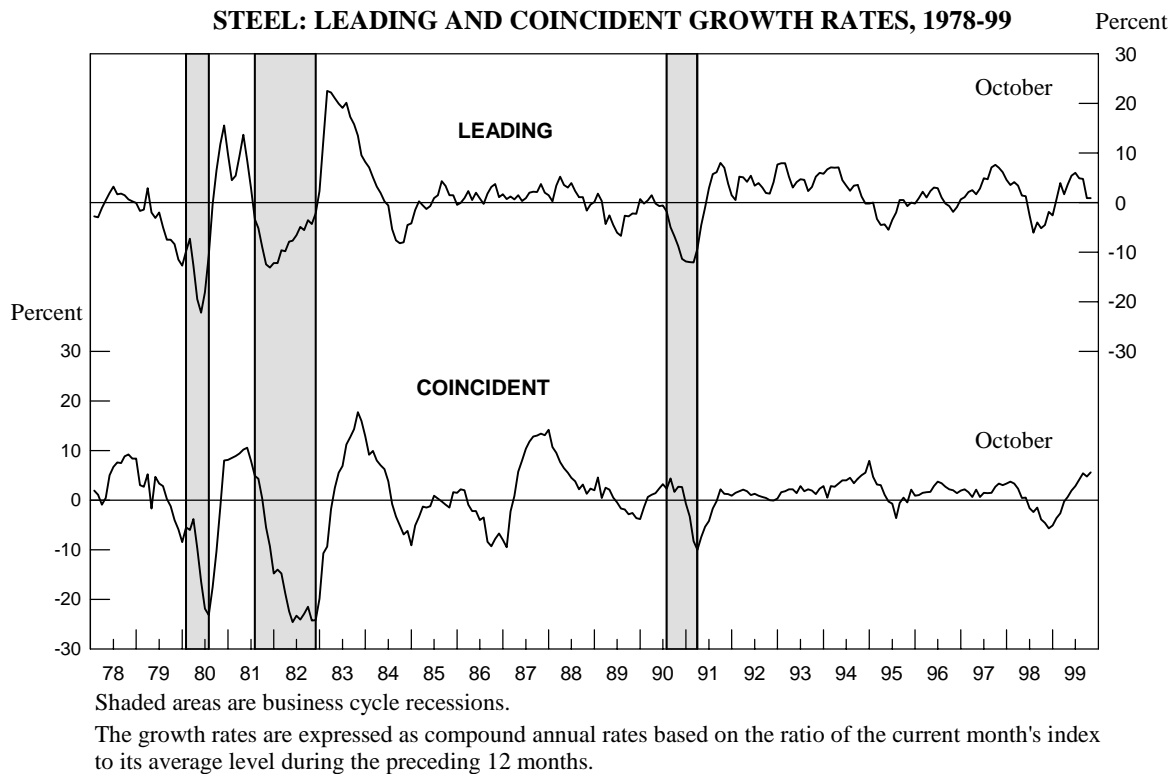


Table 6.
The Aluminum Mill Products Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1998				
November	152.7r	-0.6r	137.6r	-5.0r
December	154.9r	1.8	139.9r	-1.4r
1999				
January	155.4r	2.3	139.4r	-2.0r
February	154.8r	1.4	137.6r	-4.0r
March	156.3r	3.2	140.6r	0.4r
April	156.2r	2.8r	140.7r	0.5r
May	157.7	4.3r	141.4r	1.5r
June	159.2r	5.5r	142.3r	2.6r
July	158.7r	4.0r	141.6r	1.5r
August	157.9r	2.4	143.8r	4.6r
September	157.5r	1.6r	145.1r	6.1r
October	154.9	-1.6	141.9	1.5

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

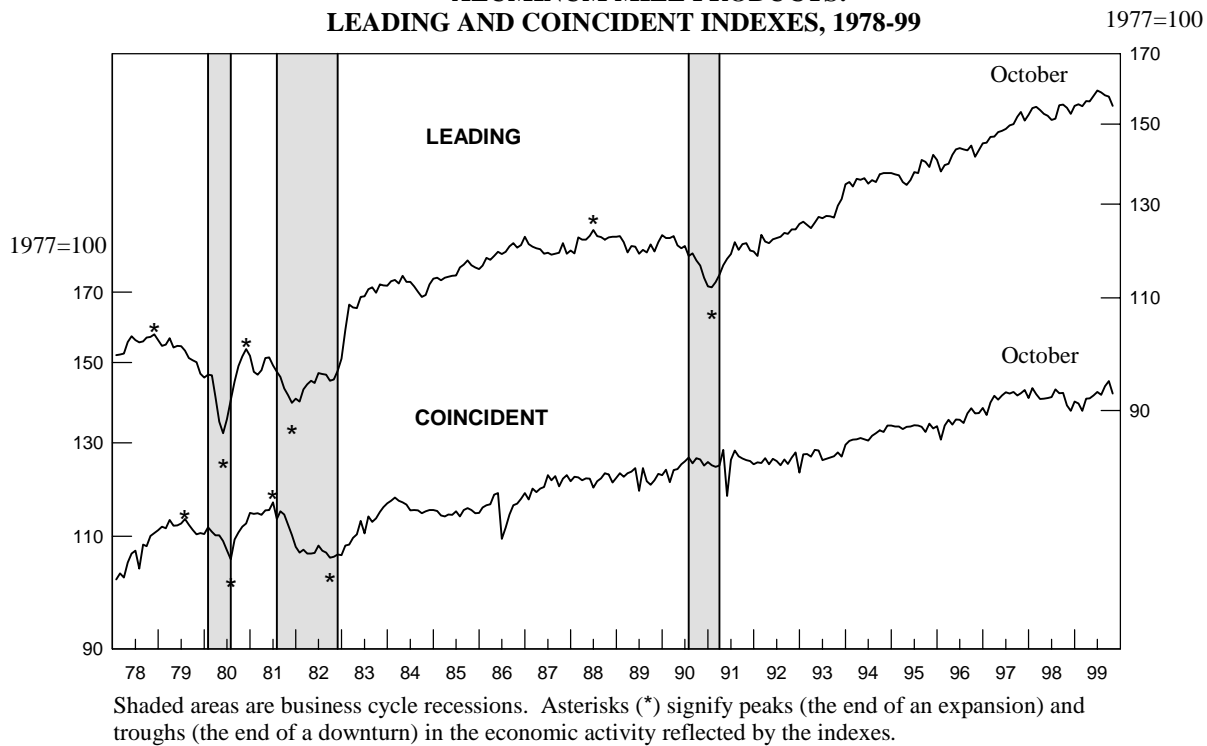
Table 7.
The Contribution of Each Aluminum Mill Products Index Component to the Percent Change in the Index from the Previous Month

Leading Index	September	October
1. Average weekly hours, aluminum sheet, plate, and foil (SIC 3353)	-0.5r	-0.9
2. Index of new private housing units authorized by permit	-0.4	0.3
3. Industrial production index for automotive products	-0.3r	0.1
4. Construction contracts, commercial and industrial (square feet)	0.2	-0.2
5. Net new orders for aluminum mill products (pounds)	0.5r	-0.7
6. Growth rate of U.S. M2 money supply, 1992\$	-0.4r	-0.2
7. Purchasing Managers' Index	0.5	-0.2
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.3r	-1.7
Coincident Index		
1. Industrial production index, aluminum sheet, plate, and foil (SIC 3353)	-0.2r	0.1
2. Total employee hours, aluminum sheet, plate, and foil (SIC 3353)	0.9	-2.5
Trend adjustment	0.2	0.2
Percent change (except for rounding differences)	0.9r	-2.2

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, Federal Reserve Board; 4, F.W. Dodge, Division of McGraw-Hill Information Systems Company; 5, The Aluminum Association, Inc. and U.S. Geological Survey; 6, Federal Reserve Board, Conference Board, and U.S. Geological Survey; 7, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted.

r: Revised

**CHART 6.
ALUMINUM MILL PRODUCTS:
LEADING AND COINCIDENT INDEXES, 1978-99**



**CHART 7.
ALUMINUM MILL PRODUCTS:
LEADING AND COINCIDENT GROWTH RATES, 1978-99**

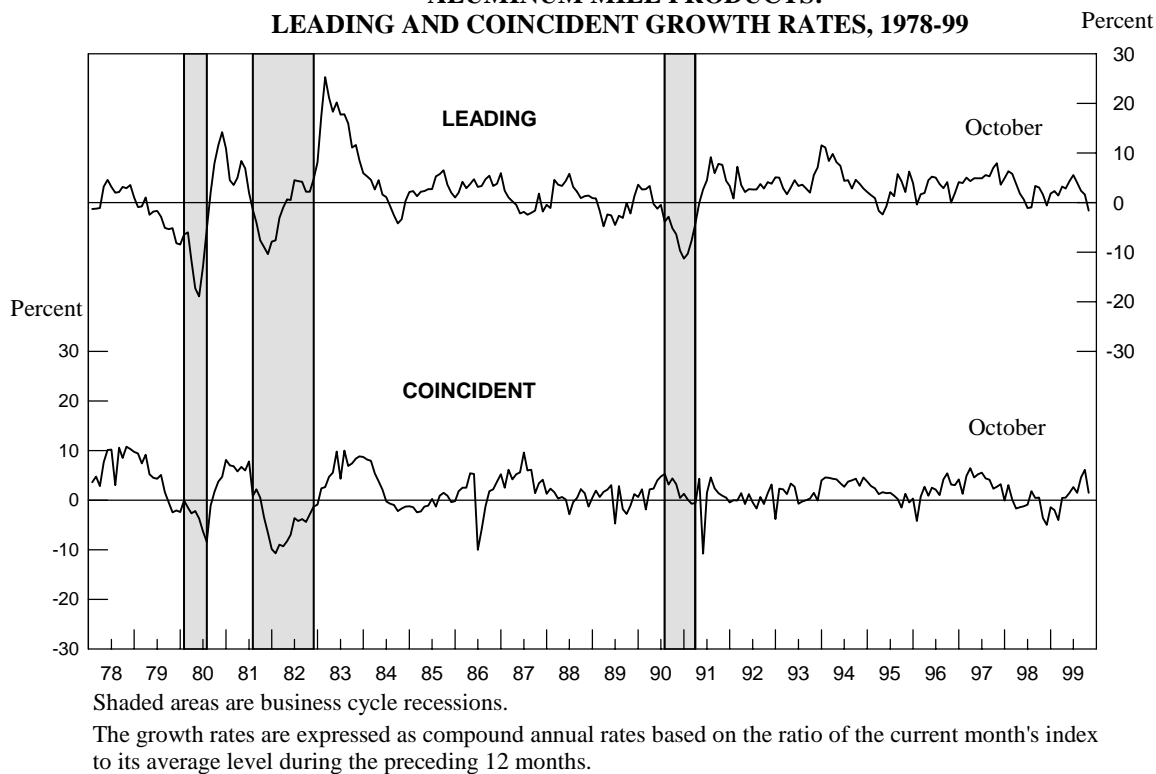


Table 8.
The Copper Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1998				
November	130.2r	4.4r	125.9r	1.4r
December	130.2r	4.0r	125.6r	0.7r
1999				
January	130.6r	4.1r	123.8r	-1.9r
February	129.3r	1.5	124.3r	-1.0r
March	128.6r	0.2	125.4r	0.8r
April	130.3r	2.6r	124.8r	-0.2r
May	130.4	2.4r	123.4r	-2.4
June	132.4r	4.9r	122.8r	-3.1r
July	133.3r	5.6r	123.0r	-2.6r
August	132.7r	4.2r	123.0r	-2.3r
September	132.2r	2.9r	121.8r	-3.8r
October	131.4	1.2	122.9	-1.8

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 9.
The Contribution of Each Copper Index Component to the Percent Change in the Index from the Previous Month

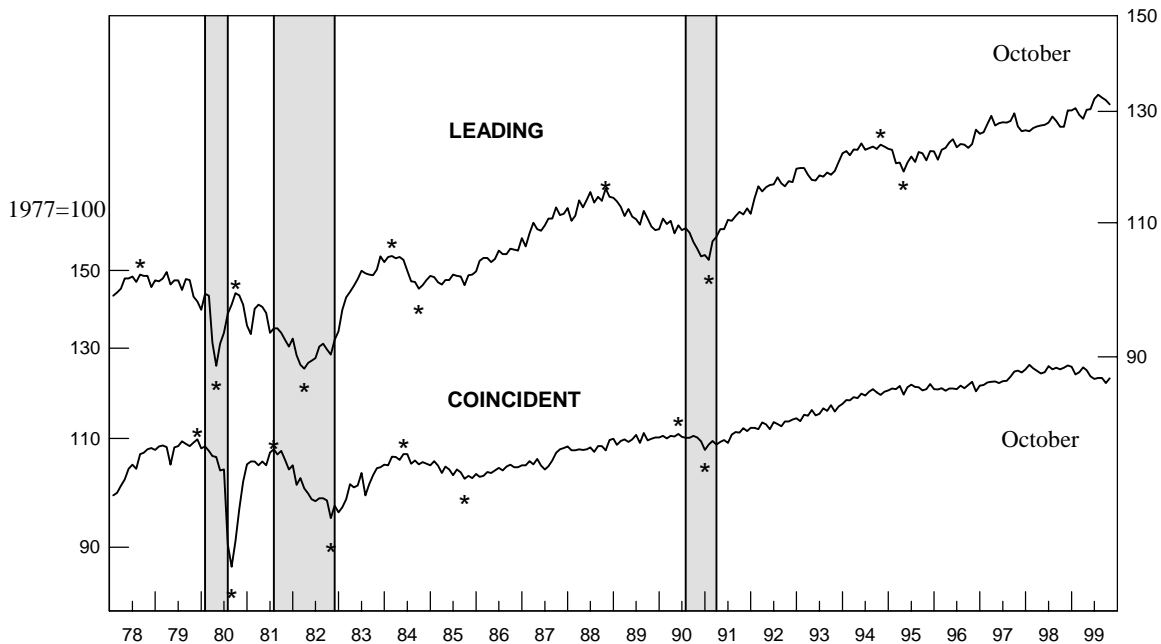
Leading Index	September	October
1. Average weekly overtime hours, rolling, drawing, and extruding of copper (SIC 3351)	0.0r	0.3
2. New orders, nonferrous and other primary metals, 1982\$	0.0r	-0.3
3. S&P stock price index, building materials companies	0.2	-0.6
4. Ratio of shipments to inventories, electronic and other electrical equipment (SIC 36)	-0.2r	-0.5
5. LME spot price of primary copper	0.2	0.0
6. Index of new private housing units authorized by permit	-0.4	0.4
7. Spread between the U.S. 10-year Treasury Note and the Federal Funds rate	-0.1	0.2
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-0.3r	-0.5
Coincident Index		
1. Industrial production index, primary smelting and refining of copper (SIC 3331)	-0.4r	0.5
2. Total employee hours, rolling, drawing, and extruding of copper (SIC 3351)	-0.7r	0.8
3. Copper refiners' shipments (short tons)	0.0r	-0.5
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-1.0r	0.9

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, Standard & Poor's; 4, Bureau of the Census and U.S. Geological Survey; 5, London Metal Exchange; 6, Bureau of the Census and U.S. Geological Survey; 7, Federal Reserve Board and U.S. Geological Survey. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics; 3, American Bureau of Metal Statistics, Inc. and U.S. Geological Survey. All series are seasonally adjusted, except 3, 5, and 7 of the leading index.

r: Revised

CHART 8.
COPPER: LEADING AND COINCIDENT INDEXES, 1978-99

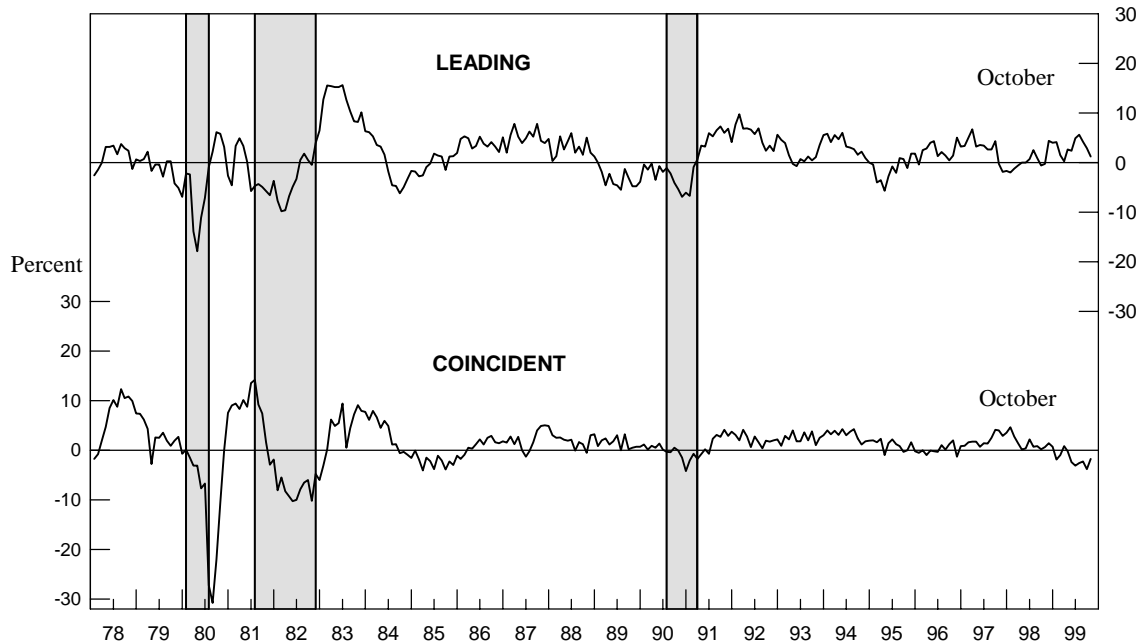
1977=100



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 9.
COPPER: LEADING AND COINCIDENT GROWTH RATES, 1978-99

Percent



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

Explanation

Each month, the U.S. Geological Survey tracks the effects of the business cycle on five U.S. metal industries by calculating and publishing composite indexes of leading and coincident indicators. Wesley Mitchell and Arthur Burns originated the cyclical-indicators approach for the economy as a whole at the National Bureau of Economic Research in the mid-1930's. Over subsequent decades this approach was developed and refined, mostly at the National Bureau, under the leadership of Geoffrey H. Moore.¹

A business cycle can briefly be described as growth in the level of economic activity followed by a decline succeeded by further growth. These alternating periods of growth and decline do not occur at regular intervals. Composite indexes, however, can help determine when highs and lows in the cycle might occur. A composite index combines cyclical indicators of diverse economic activity into one index, giving decision makers and economists a single measure of how changes in the business cycle are affecting economic activity.

The indicators in the metal industry leading indexes historically give signals several months in advance of major changes in a coincident index, a measure of current metal industry activity. Indicators that make up the leading indexes are, for the most part, measures of anticipations or new commitments to various economic activities that can affect the metal industries in the months ahead.

Composite coincident indexes for the metal industries consist of indicators for production, shipments, and total employee hours worked. As such, the coincident indexes can be regarded as measures of the economic health of the metal industries.

Four of the metal industry coincident indexes, those for primary metals, steel, primary aluminum, and aluminum mill products, reflect their classifications in the U.S. Standard Industrial Classification (SIC). The SIC is the main classification used by the United States government and industry in collecting and tabulating economic statistics. The coincident index for copper is a blend of two different copper industries, primary smelting and refining of copper and rolling, drawing, and extruding of copper.

Of the five metal industries, primary metals is the broadest, consisting of twenty-six different metal processing industries. The steel, aluminum, and copper industries are parts of the primary metals industry.

The metal industry leading indexes turn before their respective coincident indexes an average of 9 months for primary metals and 8 months for steel and copper. The average lead time for the primary aluminum leading index is 6 to 8 months, and the

¹**Business Cycle Indicators, A monthly report from The Conference Board** (March 1996).

average lead time for the aluminum mill products leading index is 6 months.

The leading index of metal prices, also published in the *Metal Industry Indicators*, is designed to signal changes in a composite index of prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange. On average, this leading index indicates significant changes in price growth about 7 months in advance.

The growth rate used in the *Metal Industry Indicators* is a 6-month smoothed growth rate at a compound annual rate, calculated from a moving average. Moving averages smooth fluctuations in data over time so that trends can be observed. The 6-month smoothed growth rate is based upon the ratio of the latest monthly value to the preceding 12-month moving average.

$$\left[\left(\frac{\text{current value}}{\text{preceding 12-month moving average}} \right)^{\frac{12}{6.5}} - 1.0 \right] * 100$$

Because the interval between midpoints of the current month and the preceding 12 months is 6.5 months, the ratio is raised to the 12/6.5 power to derive a compound annual rate.

The growth rates measure the near-term industry trends. They, along with other information about the metal industries and the world economy, are the main tools used to determine the outlook of the industries. A 6-month smoothed growth rate above +1.0% usually means increasing growth; a rate below -1.0% usually means declining growth.

The next summary is scheduled for release on MINES FaxBack at 10:00 a.m. EST, Friday, January 21. Access MINES FaxBack from a touch-tone telephone attached to a fax machine by dialing 703-648-4999. The address for *Metal Industry Indicators* on the World Wide Web is: <http://minerals.usgs.gov/minerals/pubs/mii/>

The *Metal Industry Indicators* is produced at the U.S. Geological Survey by the Minerals Information Team. The report is prepared by Kenneth Beckman (703-648-4916), e-mail (kbeckman@usgs.gov), and Gail James (703-648-4915), e-mail (gjames@usgs.gov). The Center for International Business Cycle Research, under the direction of Dr. Geoffrey H. Moore, and the former U.S. Bureau of Mines developed the metal industry leading and coincident indexes in the early 1990's. Customers can send mail concerning the *Metal Industry Indicators* to the following address:

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